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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/796,083	03/10/2004	Tomoya Sasaki	Q7987S	2686

23373 7590 05/18/2005

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EXAMINER

LEE, SIN J

ART UNIT PAPER NUMBER

1752

DATE MAILED: 05/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/796,083

Applicant(s)

SASAKI, TOMOYA

Examiner

Sin J. Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

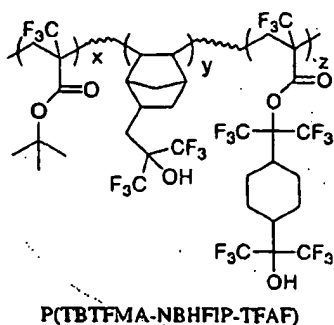
1. In view of submission of the verified English translation of applicant's priority document, JP 2003-067010 (which was filed on March 12, 2003), previous 102(a) rejection on claims 1-4 over Mizutani et al (EP'440) is hereby withdrawn. Due to newly cited prior arts, the following rejections are made non-final.

Claim Rejections - 35 USC § 102

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-7 and 12-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamada et al ("Design and Study of Resist Materials for 157 nm Lithography", Proceedings of SPIE-the International Society for Optical Engineering, vol.5039, February 2003, pg. 569-579).

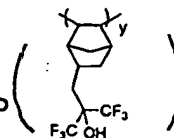
Yamada teaches (see pg.570, paragraph, 2.5 and pg.577) a 157 nm resist material containing the terpolymer of TBTFMA-NBHFIP-TFAF, which structure is shown below, a photoacid generator, a base quencher, and a surfactant.



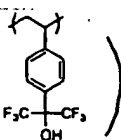
Yamada coats his photoresist film onto a silicon wafer and imagewise exposes the film with 157 nm light. After the exposure, the film is developed with a developer.

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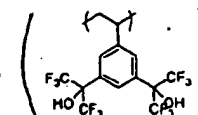
Yamada compares the dissolution rate of the polymer of NBHFIP



, the polymer of STYHFIP



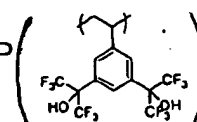
and the polymer of STYBHFIP



, and states that the dissolution rate of P(STYBHFIP) is the fastest among the polymers tested (see first three paragraphs of pg.571). In view of such teaching, it is the

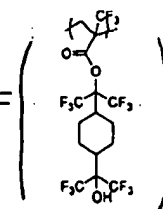
Examiner's position that one skilled in the art would immediately envisage replacing the

second repeat unit of the terpolymer shown above with the repeat unit of STYBHFIP

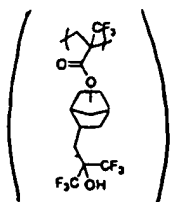


because Yamada teaches that the polymer made from STYBHFIP monomer provides the fastest dissolution rate. The repeat unit of STYBHFIP teaches present repeat unit having the two groups of the formula (Z), and the last repeat unit of the terpolymer shown above teaches present repeat unit of formula (III) (present R_8 being a trifluoromethyl group, and present A_1 being the formula of (A1) in which R_{4a} and R_{5a} are fluoroalkyl groups, Z_1 is a cyclohexyl group, L_2 being $-C(CF_3)_2-$ (a bivalent connecting group), and X being a hydroxyl group). Since the terpolymer shown above contains the t-butyl group in the first repeat unit (Yamada's first repeat unit also teaches present repeat unit of formula (VIII) of present claim 4), Yamada's terpolymer is acid-decomposable. Therefore, Yamada teaches present inventions of claims 1-4, 6, 7, 12-14.

With respect to present claim 5, Yamada compares the repeat unit of TFAF



and NBHFIPTFM



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(see pg.571, paragraph (e)) and states that the polymer that contains NBHFIPTFM is lighter than TFAF, and as a result, the polymer that contains NBHFIPTFM is faster than the polymer that contains TFAF in terms of dissolution rate. Based on this teaching, it is the Examiner's position that one skilled in the art would immediately envisage replacing the third repeat unit of Yamada's terpolymer shown above with the repeat unit of NBHFIPTFM with an anticipation of a faster dissolution rate. The repeat unit of NBHFIPTFM teaches present repeat unit of formula (III) of claim 1 (in present formula (A₁), m is zero, Z₁ is a norbornyl group, L₂ is -CH₂-C(CF₃)₂- (a bivalent connecting group), and X is a hydroxyl group) as well as the present Z₁ of claim 5. Therefore, Yamada teaches present invention of claim 5.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al ("Design and Study of Resist Materials for 157 nm Lithography", Proceedings of SPIE-the International Society for Optical Engineering, vol.5039, February 2003, pg. 569-579) in view of Aoai et al (6,013,411).

Although Yamada does not explicitly teach the use of a non-polymeric dissolution inhibitor, it is well known in the art, as evidenced by Aoai, col.43, lines 35-43, to use a dissolution inhibiting compound in a positive photosensitive composition in order to

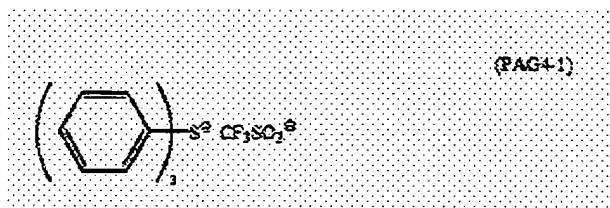
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improve the dissolution discrimination between exposed and unexposed areas.

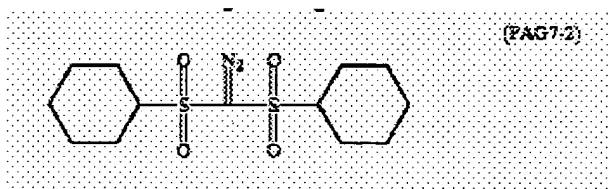
Therefore, it would have been obvious to one of ordinary skill in the art to use a dissolution inhibitor in Yamada's photoresist material in order to improve the dissolution discrimination between exposed and unexposed areas. Therefore, Yamada in view of Aoi would render obvious present invention of claim 8.

6. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al ("Design and Study of Resist Materials for 157 nm Lithography", Proceedings of SPIE-the International Society for Optical Engineering, vol.5039, February 2003, pg. 569-579) in view of Kodama et al (US 2001/0041300 A1).

Although Yamada teaches that his photoresist material includes a photoacid generator, Yamada does not give any detail as to what kind of photoacid generator can be used. Kodama teaches ([0014], [0017]) a positive composition which contains the combination of a photoacid generator that generates a carboxylic acid and a photoacid generator that generates a sulfonic acid. Kodama teaches ([0011]) that such composition is improved in resolution and process allowance such as exposure margin and depth of focus in a lithographic technology. As one of examples of combination of his photoacid generators, Kodama teaches in Example 23 (see Table 1) a combination of a photoacid generator (II-16) that generates a carboxylic acid and two photoacid generators (C-3) and (C-4), both of which generate a sulfonic acid. The photoacid generator (C-3) is (PAG4-1) which structure is shown below



, and the photoacid generator (C-4) is (PAG7-2) which structure is shown below



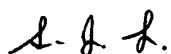
. Therefore, Kodama teaches a combination of a photoacid generator that generates a carboxylic acid, a photoacid generator that generates a fluorinated sulfonic acid and a photoacid generator that generates a sulfonic acid containing no fluorine atom. Based on Kodama's teaching, would have been obvious to one of ordinary skill in the art to use the combination of photoacid generators as taught by Kodama in Yamada's photoresist material in order to obtain a photoresist composition improved in resolution and process allowance such as exposure margin and depth of focus in a lithographic technology. Therefore, Yamada in view of Kodama would render obvious present inventions of claims 9-11.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

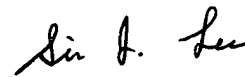
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



S. Lee
May 15, 2005



SIN LEE
PRIMARY EXAMINER